DUKHIN, S.S.; DERYAGIN, B.V.

Thermodynamics of irreversible processes as applied to the theory of capillary osmosis and diffusion phoresis. Dokl. AN SSSR 159 no.2:401-404 N '64. (MIRA 17:12)

1. Laboratoriya poverkhnostnykh yavleniy instituta fizicheskoy khimii AN SSSR i Institut obshchey i neorganicheskoy khimii AN UkrSSR. 2. Chlen-korrespondent AN SSSR (for Deryagin).

DUKHIN, S.S.; DERYAGIN, B.V.

Application of the thermodynamics of irreversible processes to the theory of electroosmosis, electrophoresis, capillary osmosis, anddiffusion phoresis in electrolytes. Dokl. AN SSSR 159 no.3:636-639 N '64 (MIRA 18:1)

1. Institut fizicheskoy khimii AN SSSR i Institut obshchey i neorganicheskoy khimii AN UkrSSR. 2. Chlen-korrespondent AN SSSR (for Deryagin).

POPOVSKIY, Yu.M.; DERYAGIN, B.V.

Heat capacity of a liquid in disperse systems. Dokl. AN SSSR 159 no.4:897-899 D '64 (MIRA 18:1)

1. Institut fizicheskoy khimii AN SSSR i Odesskoye vyssheye morekhodnoye uchilishche. 2. Chlen-korrespondent AN SSSR (for Deryagin).

L 24865-66 EWT(m)/EWP(j)/T/ETC(m)-6 IJP(c) WW/DJ/GS/RM

ACC NR: AT6008941 (A) SOURCE CODE: UR/0000/65/000/000/0026/0033

AUTHORS: Deryagin, B. V.; Toporov, Yu. P.; Smirnova, A. M. 64

ORG: none 61

TITLE: Some regularities of the external friction of polymers B+1

SOURCE: Moscow. Institut mashinovedeniya. Plastmassy v podshipnikakh skol'zheniya; issledovaniya, opyt primeneniya (Plastics in friction bearings; research and experiment in application). Moscow, Izd-vo Nauka, 1965, 26-33

TOPIC TAGS: polymer, friction, polyethylene plastic, iron powder, steel, melting point, molecular weight / ShKh15 steel

ABSTRACT: The frictional properties of polymers were tested. The work is a continuation of previous work by B. V. Deryagin and Yu. P. Toporov (Dokl. AN SSSR, 1962, 146, 1356). The tests consisted of measuring the static friction force between the upper and lower surfaces of a flat gauge moving in a horizontal plane and between the surfaces of two polymer specimens. The gauges were of ShKh15 steel and had surfaces of 10th—12th class smoothness. Polyethylene with a molecular weight of 20 000 and a melting point of 110C was tested. Dendritic iron was used as a filler. Thermomechanical compression curves of polyethylene were plotted by Kargin's method for a pressure of 40 kg/cm^2 (see Fig. 1). Specimens with 0, 80,

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L 24865-66

ACC NR: AT6008941

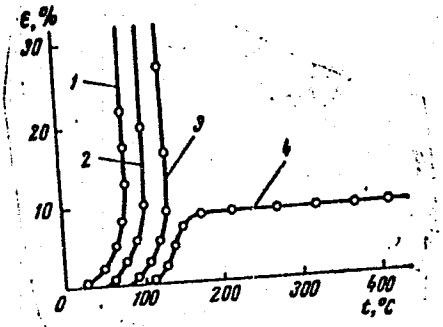

Fig. 1. Relative deformation of polyethylene versus temperature for: 1 - 0% Fe; 2 - 50% Fe; 3 - 80% Fe; 4 - 90% Fe.

and 90% filler were used to study frictional properties. It is found that filling the polyethylene with highly dispersed iron has practically no effect on its frictional properties under conditions of static friction over a wide range of normal loads. The filler increases both the mechanical strength of the specimens and their ability to withstand a normal load. Orig. art. has: 2 formulas and 8 graphs.

SUB CODE:07, 11/SUBM DATE: 31Jul65/ ORIG REF: 009/ OTH REF: 001

L 3791-66 EWP(h)
EWT(d)/EWT(m)/EWP(w)/EPF(c)/EWP(v)/EWP(j)/T/EWP(t)/EWP(k)/EWP(b)/EWP(l)
ACCESSION NR: AP5023212 JD/WW/DJ/RM
UR/0374/65/000/004/0117/0122
620.179.4

AUTHOR: Deryagin, B. V. (Moscow); Toporov, Yu. P. (Moscow)

TITLE: Investigation of speed dependence of rolling friction as a method of adhesion testing

SOURCE: Mekhanika polimerov, no. 4, 1965, 117-122

TOPIC TAGS: friction, solid mechanics, friction coefficient, adhesion, intermolecular force, polymer, polyisobutylene, methacrylate plastic

ABSTRACT: A device is described for investigating the rolling friction of solids. It may be used to study adhesion processes. The device, which is based on reciprocal rolling of two cylinders, is shown in fig. 1 of the Enclosure. The resistance to rolling of solids covered with noncompatible polymer increases monotonically with rolling speed. The dependence of friction coefficient η upon the logarithm of rolling rate log V, is shown in fig. 2 of the Enclosure. The resistance to rolling of solids covered with compatible polymers reaches a maximum with increasing speed and subsequently decreases in accordance with the diffusion mechanism of sticking. The dependence of friction coefficient η upon logarithm of rol-

Card 1/5

L 3791-66

ACCESSION NR: AP5023212

3

ling rate log V for both surfaces lined with SKS-30-1 rubber is shown in fig. 3 of the Enclosure. "The authors express sincere thanks to Professor S. S. Voyutskiy for valuable advice and supplying the samples." Orig. art. has: 6 figures.

ASSOCIATION: none

SUBMITTED: 18Mar65 ENCL: 03 SUB CODE: GC, MT

NO REF SOV: 005 OTHER: 000

Card 2/5

L 3791-66

ACCESSION NR: AP5023212

ENCLOSURE: 01

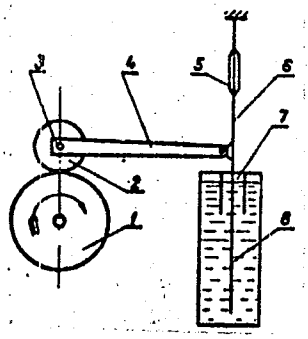

Fig. 1. 1--cylinder; 2--roller; 3--roller's fixing bolt; 4--holder; 5--strain gage; 6--dynamometer; 7--container filled with water; 8--damping blade.

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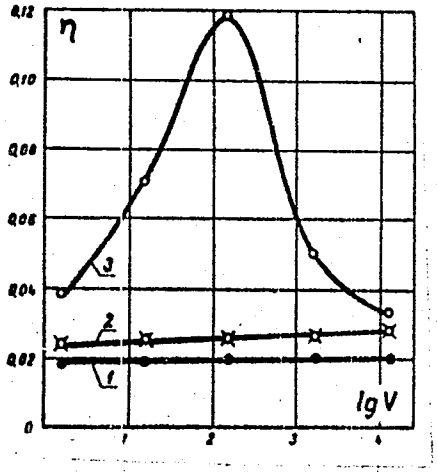
L 3791-66

ACCESSION NR: AP5023212

ENCLOSURE: 02



log V

Fig. 2. 1--brass-steel friction system at normal load N = 60g; 2--organic glass-steel friction system at N = 12g; and 3--both friction surfaces lined with polyisobutylene at N=60g.

Card 4/5

L 3791-66

ACCESSION NR: AP5023212

ENCLOSURE: 03

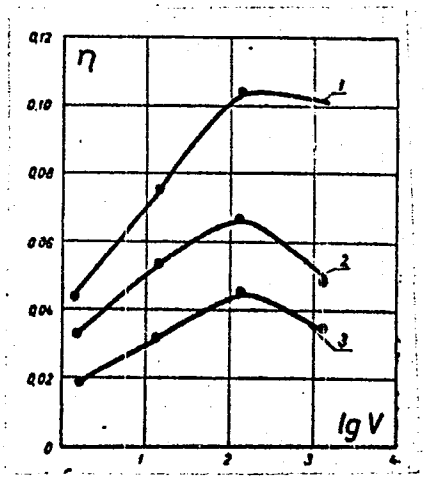


Fig. 3. 1--lining made of SKS-30 + 10% methacrylic acid; 2--lining made of SKS-30 + 1.28% methacrylic acid; 3--lining made of SKS-30 + 0.5% methacrylic acid.

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L 29100-65 EWT(m)/EPF(c)/EWP(v)/EPF/EWP(j)/T/EWP(t)/EWP(b) Pc-4/Pr-4/Ps-4
RM/JD/RM
ACCESSION NR: AP5004741 S/0069/65/027/001/0035/0041

39
36
B

AUTHORS: Dervagin, B. V.; Karasev, V. V.; Medvedeva, A. M.; Zhorebkov, S. K.

TITLE: Electron emission during peeling of different vulcanized rubbers from metal and glass in vacuum

SOURCE: Kolloidnyy zhurnal, v. 27, no. 1, 1965, 35-41

TOPIC TAGS: electron emission, vulcanized rubber, rubber, adhesion, polar polymer/ TeVL 100 high vacuum pump

ABSTRACT: Electron emission during the peeling of rubber substrates in various states and their adhesion properties to metallic surfaces were investigated. The first phase was a study of adhesive properties of filled and pure channel black vulcanized rubber (on six different rubber bases) to steel. Vulcanizates with rubber bases containing polar groups (Cl, CN) adhere to metals better than vulcanized rubber with nonpolar rubber bases. In addition, the adhesive power of vulcanizates filled with channel black is greater than that of the pure specimens. Electron emission measurements during peeling registered emission currents only in the case of pure vulcanized rubber on a nonpolar rubber base. Analysis of these results shows that if one of the two surfaces in contact does not possess bulk conductivity,

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L 29100-65 3

ACCESSION NR: AP5004741

electron emission and gaseous discharge can be observed during the peeling process in vacuum. If both surfaces possess bulk conductivity properties, a charge leakage will inhibit electron emission as well as the gas discharge. However, the work of peeling the film from the metallic or glass substrate may be larger in the latter case than in the former, if the charge density diminishes slowly with increasing gap width. Orig. art. has: 4 figures, 3 tables, and 3 formulas.

ASSOCIATION: Nauchno-issledovatel'skiy institut rezinovoy promyshlennosti (Scientific Research Institute for the Rubber Industry); Institut fizicheskoy khimii AN SSSR Moscow (Institute of Physical Chemistry, AN SSSR)

SUBMITTED: 14May63 ENCL: 00 SUB CODE: NP,MT

NO REF SOV: 007 OTHER: 002

Card 2/2

L 53724-65 EWT(m) Pi-4 EWH

ACCESSION NR: AP5014523 UR/0069/65/027/003/0349/0356
541.12.01

AUTHOR: Deryagin, B. V.; Kurgin, Yu. S.

TITLE: Effect of periodic pressure oscillations on phase equilibrium. Part 3. Liquid-vapor-gas mixture, plane interface

SOURCE: Kolloidnyy zhurnal, v. 27, no. 3, 1965, 349-356

TOPIC TAGS: liquid phase, gas phase, phase equilibrium, surface active substance

ABSTRACT: In the first two parts of the study, the authors considered the phenomena associated with periodic sinusoidal volume oscillations of a single-component gaseous phase bounding a liquid phase. In the present article, a liquid in contact with a vapor-air mixture is treated in similar fashion. A formula is derived for the shift of the phase equilibrium in this system when the latter is subjected to pressure oscillations. Calculations are carried out for water vapor and benzene vapor in air, and also water vapor in air over a water surface covered with an adsorption layer of surface active substances having a negligibly small condensation coefficient. A relationship is found between the vapor density for an average posi-

Card 1/2

L 53724-65

ACCESSION NR: AP5014523

tion of the piston in the volume of the gas phase and the saturated vapor density prior to the start of the oscillations. Orig. art. has: 40 formulas.

ASSOCIATION: Institut fizicheskoy khimii AN SSSR, Moscow (Institute of Physical Chemistry, AN SSSR)

SUBMITTED: 29Nov63 ENCL: 00 SUB CODE: GC

NO REF SOV: 002 OTHER: 001

Card 2/2

DERYAGIN, B.V.; MARTYNOV, G.A.; GUTOP. Yu.V.

Thermodynamics and stability of free films. Koll.zhur. 27 no.3:357-364 My-Je '65. (MIRA 18:12)

1. Institut fizicheskoy khimii AN SSSR, Moskva. Submitted Nov. 3, 1964.

L 63342-65 EPA(s)-2/EWT(m)/EPF(c)/EWP(v)/EWP(j)/T/EWP(t)/EWP(k)/EWP(b)/
EWA(c) JD/WW/JW/HM/RM

ACCESSION NR: AP5020234 UR/0069/65/027/004/0624/0626
539.612

AUTHORS: Voyutskiy, S. S.; Deryagin, B. V.

TITLE: The invalidity of a purely thermodynamic treatment of the adhesion of solid state matter

SOURCE: Kolloidnyy zhurnal, v. 27, no. 4, 1965, 624-626

TOPIC TAGS: adhesion, adhesive bonding, adhesive material, adhesive bond

ABSTRACT: This paper criticizes the adhesion theory of L. H. Sharpe and H. Schonhorn (Chem. and Engng. News 41, 41, 1963). In particular, the authors question the applicability of the above theory to the adhesion of solid bodies to one another. The criticism is based on three points: 1) The main criterion of adhesion, according to Sharpe and Schonhorn, is the ability of liquid A to wet the surface of solid B. The authors point out that this criterion is not valid for the case of two solid bodies. 2) The theory is applicable to the equilibrium separation of phases and is therefore not valid for the separation of solid phases, which is a nonequilibrium process as shown by B. V. Deryagin and N. A. Krotova (Adgeziya, Izdvo AN SSSR, M - L., 1949). 3) The equality $W_{coh} = 2F_{L,V_1^0}$, where W_{coh} is the work

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L 6384-65

ACCESSION NR: AP5020234

of cohesion and $F_{L_2V_2}$ is the free surface energy at the liquid vapor boundary, is not valid for solid bodies. In the case of polymer-substrate adhesion, it is found that the work of separation is several times that of $2F_{L_2V_2}$. This discrepancy the authors attribute to the nonequilibrium nature of the separation process. It is concluded that a purely thermodynamic approach to the adhesion of polymers to solids is invalid. Orig. art. has: 6 equations.

ASSOCIATION: Institut tonkoy khimicheskoy tekhnologii (Institute for Fine Chemical Technology); Institut fizicheskoy khimii, AN SSSR, Moskva (Institute for Physical Chemistry, AN SSSR)

SUBMITTED: 10Mar64 ENCL: 00 SUB CODE: TD, SS

NO REF SOV: 005 OTHER: 005

Card 2/2

DERYAGIN, B.V.; GUTOP, Yu.V.

Disjoining pressure and equilibrium of free films. Koll. zhur. 27 no.5:674-680 S-O '65. (MIRA 18:10)

1. Institut fizicheskoy khimii AN SSSR, Moskva.

L 32910-65 EWP(e)/EWT(l)/EWT(m)/EWP(t)/EWP(k)/EWP(b) Pf-4 JAJ/RWH/JD/JW/JAJ

ACCESSION NR: AP5004599 S/0020/65/160/002/0387/0389

AUTHOR: Deryagin, B. V. (Corresponding member AN SSSR); Nerpin, S. V.; Krutyumyan, M. T.

TITLE: Thermomechanical effect at ordinary temperatures

SOURCE: AN SSSR. Doklady, v. 160, no. 2, 1965, 387-389

TOPIC TAGS: osmosis, thermodynamics, membrane, porous material, fluid flow

ABSTRACT: A liquid flowing through a porous membrane displays two effects of special interest: thermochemical--temperature change ΔT on both sides of the membrane at a given pressure drop; and thermoosmotic--pressure change ΔP which occurs at a given temperature drop ΔT. The thermodynamics of irreversible processes relates these effects as follows:

$$\frac{a\Delta P}{a\Delta T} = \frac{Q^*}{vT}$$

where v is the molar volume; T is absolute temperature; Q^* is transport heat equal to U^*-w; U^* is specific transport energy; w is specific heat of the fluid. The

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L 32910-65
ACCESSION NR: AP5004599

3

necessary condition for these effects is $Q^* \neq 0$, i.e. $U^* \neq w$. Fluids flowing through a porous membrane are in the field of action of surface forces, the total effect of which depends on the specific surface of the given porous medium. If the surface forces are not rigidly bound to their solid substratum but are mobile, then during the flow of the fluid through a porous membrane one would expect $Q^* \neq 0$, i.e. $U^* \neq w$. Thus, the ~~thermocapillar~~ and thermomolecular effects during the flow of fluid through a porous membrane with sufficiently small pores may differ from zero. In the conducted experiment when the flow rate of water J was less than 0.0023 cm^2/sec ($\Delta P<50$ mm of Hg) ΔT was immeasurable. It is presumed that the surface layer possessing some limiting shear stress begins to flow at some $\Delta P>\Delta P_o$, where in this experiment $\Delta P_o > 50$ mm Hg. Orig. art. has: 2 figures.

ASSOCIATION: Institut fizicheskoy khimii Akademii nauk SSSR (Institute of Physical Chemistry, Academy of Sciences SSSR); Agrofizicheskiy institut Vsesoyuznoy akademii sel'skokhozyaystvennykh nauk (Institute of Agricultural Physics, All-Union Academy of Agricultural Sciences); Institut pustyn' Akademii nauk TurkmSSR (Institute of Deserts, Academy of Sciences Turkm SSR)

SUBMITTED: 21Oct64 ENCL: 00 SUB CODE: GC

NO REF SOV: 003 OTHER: 000

Card 2/2

L 43861-65 EPF(n)-2/EPR/EWG(v)/EPA(w)-2/EWT(l)/EWT(m)/EWP(k)/EWP(l)/EWP(b)/EWP(e)
Pe-5/Pq-4/Ps-4/Pu-4 GG/WH/WW
ACCESSION NR: AP5006851 S/0020/65/160/004/0799/0802 43 42 B

AUTHOR: Bazaron, U. B., Deryagin, B. V. (Corresponding member AN SSSR); Bulgadayev, A. V.

TITLE: Shear elasticity of boundary layers of liquids 21

SOURCE: AN SSSR. Doklady, v. 160, no. 4, 1965, 799-802

TOPIC TAGS: liquid state, liquid film, shear elasticity, shear modulus, mineral oil, castor oil, oleic acid

ABSTRACT: The research reported in this article is a sequel to earlier work by one of the authors (Deryagin, DAN 101, no. 2, 289, 1955 and others), where it was shown that thin films of liquids bordering on a solid can have special properties not possessed by the bulk liquid. In this investigation, the shear elasticity of a liquid was investigated by an ultrasonic method using an X-cut quartz resonator in the form of a rectangular slab. This method was used earlier by one of the authors (Bulgadayev, Uch. zap. Buryatsk. gos. ped. inst., Ulan-Ude, v. 15, 1958) to observe shear elasticity in some liquids. The method consists essentially of determining the shift in the resonant frequency of the quartz when its side

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ACCESSION NR: AP5006853

surface is brought in contact with another solid by the liquid film. The idea of the method is illustrated in Fig. 1 of the Enclosure. An expression is derived for the relative shift in the resonant frequency in terms of the shear modulus of the film, the contact area, the mass of the quartz, and the thickness of the film. Plots are presented of the frequency shift against the reciprocal of the film thickness for mineral oil, castor oil, and oleic acid, for which the values obtained for the shear modulus from these results are 3.8×10^5, 2.4×10^6, and 4.2×10^5 dyne/cm^2, respectively. Some extraneous phenomena observed for castor oil and oleic acid at small thicknesses and large oscillations are briefly explained. Orig. art. has: 4 figures and 3 formulas.

ASSOCIATION: Buryatskiy kompleksnyy nauchno-issledovatel'skiy institut Sibirskogo otdeleniya Akademii nauk SSSR (Buryatsk Comprehensive Scientific Research Institute, Siberian Department, Academy of Sciences SSSR); Institut Fizicheskoy Khimii Akademii nauk SSSR (Institute of Physical Chemistry, Academy of Sciences SSSR)

SUBMITTED: 17Aug64 ENCL: 01 SUB CODE: ME

NR REF SOV: 009 OTHER: 001

L 40742-65 EWT(m)/EPF(c)/EPR/EWP(j)/T/EWP(v) Pc-4/Pr-4/Ps-4 WW/RM
ACCESSION NR: AP5010167 UR/0020/65/161/002/0377/0379

AUTHOR: Voyutskiy, S. S.; Deryagin, B. V. (Corresponding member AN SSSR); Rayevskiy, V. G. 42 41 B

TITLE: Nature of the adhesive bond between polymers

SOURCE: AN SSSR. Doklady, v. 161, no. 2, 1965, 377-379

TOPIC TAGS: polymer adhesion, chemical bonding, polymer physical chemistry

ABSTRACT: B. V. Deryagin, Corresponding Member of the Academy of Sciences USSR and author of the theory according to which the adhesion of polymers is due to attraction of the charges of a double electrical layer formed at the separation surface of two bodies brought in contact, and Professor S. S. Voyutskiy, author of the diffusion theory of adhesion, provide a critical review of an article by M. M. Reznikovskiy and B. Z. Kamenskiy. In the article, entitled "Dependence of the rubber-to-rubber bond strength on time" (DAN, 155, 924, 1965) and presented by Academician V. A. Kargin, Reznikovskiy and Kamenskiy oppose the diffusion theory of adhesion and submit the following arguments in support of a theory according to which

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the polymer-to-polymer adhesive bond can be the result of chemical or physical surface interactions:

1) The favorable effect of temperature and contact time on the adhesion strength can be argued in support of both the diffusion and surface interaction theories.

2) Polymers form adhesive bonds predominantly in the viscous flow state when their molecules are in macrobrownian movement. This fact contradicts one of the basic concepts of the diffusion theory, according to which adhesive bonds are formed by mutual diffusion of elements of molecular chains as a result of their microbrownian movement.

3) Adhesion of polymers increases with the roughness of the substrate (a factor which should hamper mutual diffusion).

4) Prolonged aging of vulcanizate joints (a factor which should favor mutual diffusion) does not affect the adhesion strength.

APPROVED FOR RELEASE: Thursday, July 27, 2000 CIA-RDP86-00513R00031022(

L 40742-65
ACCESSION NR: AP5010167

Referring to 19 studies, Deryagin and Voyutskiy disprove the arguments of Reznikovskiy and Kamenskiy point by point, and conclude that 1) adhesion of polymers cannot be attributed to the effect of surface interactions and 2) the adhesion of polymers to polymer substrata can be better explained by the mutual penetration of the elements of molecular chains (in the case of compatible polymers), or by the effect of electrostatic forces as a result of the formation of a double electrical layer at the contact zone.

ASSOCIATION: none

SUBMITTED: 22Sep64 ENCL: 00 SUB CODE: OC, GC

NO REF SOV: 021 OTHER: 002 ATD PRESS: 3227-F

Card 3/3

L 53009-65 EWT(1)/EWT(m)/EEC(t)/EWA(m)-2

ACCESSION NR: AP5010576 UR/0020/65/161/003/0572/0574

AUTHOR: Yalamov, Yu. I.; Deryagin, B. V. (Corresponding member AN SSSR) 17 B

TITLE: Concerning temperature stresses in unevenly heated gases 1

SOURCE: AN SSSR. Doklady, v. 161, no. 3, 1965, 572-574

TOPIC TAGS: temperature stress, kinetic theory, gas heating, temperature gradient, Pascal's law 21

ABSTRACT: The authors derive a rigorous expression for the stress tensor in a gas in which there is a temperature gradient, and show, retaining terms that are quadratic in the temperature gradient, that the stress tensor in the gas is isotropic. This contradicts Maxwell's theory, in which the second order terms have been neglected, and which leads to an anisotropy of the pressure in different directions, thus contradicting Pascal's law. Since experimental results obtained at the Laboratory of Surface Phenomena of the Institut fizicheskoy khimii (Institute of Physical Chemistry) AN SSSR disclosed no anisotropy in the case discussed in the article, that of an unevenly heated gas in a narrow slot, it is concluded that Max-

Card 1/2

L 53009-65

ACCESSION NR: AP5010575

well's investigation was in error as a result of neglecting the second order terms. Orig. art. has: 25 formulas.

ASSOCIATION: Institut fizicheskoy khimii Akademii nauk SSSR (Institute of Physical Chemistry, Academy of Sciences SSSR)

SUBMITTED: 11Nov64 ENCL: 00 SUB CODE: TD

NR REF SOV: 004 OTHER: 014

Card 2/2

DERYAGIN, B.V.; RABINOVICH, Ya.I.

Experimental test of the validity of Pascal's law in nonuniformly heated gases. Dokl. AN SSSR 162 no.1:50-53 My '65. (MIRA 18:5)

1. Institut fizicheskoy khimii AN SSSR. 2. Chlen-korrespondent AN SSSR.

L 16962-66 EWT(m)/T DS/WW

ACC NR: AP6009022 SOURCE CODE: UR/0020/65/165/002/0364/0367

AUTHOR: Yalamov, Yu. I.; Deryagin, B. V. (Corresponding member AN SSSR)

ORG: Institute of Physical Chemistry, Academy of Sciences, SSSR (Institut fizicheskoy khimii Akademii nauk SSSR)

TITLE: Theory of diffusion phoresis of large nonvolatile aerosol particles

SOURCE: AN SSSR. Doklady, v. 165, no. 2, 1965, 364-367

TOPIC TAGS: aerosol, gas diffusion, applied mathematics, entropy

ABSTRACT: A previous work developed the theory of the diffusion phoresis of small aerosol particles ($Kn \equiv \lambda_i / R \gg 1$), where R is the radius of the particle and λ_i is the mean free path of a molecule of the i^{th} component of a binary mixture. Brock has attempted to calculate the rate of the diffusion phoresis of large particles. Taking into account the effect of "diffusion phoretic slip," he mistakenly assumed that the velocity distribution of the gas molecules in collision on the surface of an aerosol particle did not differ substantially from the volumetric. In the present paper, the rate of diffusion phoresis for large particles is found from the kinetic equations for the transfer of a gas through an "aerosol barrier" separating two vessels. The temperature is everywhere equal to T. Between the two vessels there are maintained differences in concentration of the first and second gases, ΔC_1 and ΔC_2, and of the pressure Δp. Here, $C_1 = n_1/n$ and $C_2 = n_2/n$, where n_1

Card 1/2 UDC: 541.12→533.7

and n_2 are the number of molecules of a component of the mixture in unit volume, $n = n_1 + n_2$. The rate of formation of entropy ΔS can in this case be expressed in the form:

$$\Delta \dot{S} = -I_1 \frac{\Delta \mu_1}{T} - I_2 \frac{\Delta \mu_2}{T}, \qquad (1)$$

where $I_1 = n_1 \bar{v}_1$ and $I_2 = n_2 \bar{v}_2$ are the volumetric gas flows through the barrier, $\bar{v}_1$ and $\bar{v}_2$ are the average linear components of the velocities of the molecules in a direction normal to the barrier, and $\Delta \mu_1$ and $\Delta \mu_2$ are the differences in the chemical potentials. After a lengthy mathematical development, the authors arrive at the following expression for the rate of diffusion phoresis of aerosol particles relative to the gas:

$$V_D = -D_{12} \frac{n(4m_2 - m_1)}{3\rho} \overline{\operatorname{grad} C_1}. \qquad (36)$$

From Equation 36, we get for the diffusion phoretic force on a particle:

$$F_D = 6\pi\eta R \bar{V}_D. \qquad (37)$$

It is concluded that the transitional section between the conditions for "small" and "large" particles is very narrow. Orig. art. has: 2 figures and 37 formulas.

SUB CODE: 20 / SUBM DATE: 04May65 / ORIG REF: 015 / OTH REF: 007

Card 2/2 vmb

DERYAGIN, B.V.; TALAYEV, M.V.; FEDYAKIN, N.N.

Allotropy of liquids during condensation of their vapors in quartz capillaries. Dokl. AN SSSR 165 no.3:597-600 N '65. (MIRA 18:11)

1. Institut fizicheskoy khimii AN SSSR. 2. Chlen-korrespondent AN SSSR (for Deryagin).

FEDYAKIN, N.N.; DERYAGIN, B.V.; NOVIKOVA, A.V.; TALAYEV, M.V.

Mechanism underlying the formation of water columns with particular properties in the condensation of water vapors in wide freshly drawn glass capillaries. Dokl. AN SSSR 165 no.4:878-881 D '65. (MIRA 18:12)

1. Institut fizicheskoy khimii AN SSSR. 2. Chlen-korrespondent AN SSSR (for Deryagin).

L 07584-67 EWT(m)/EWP(t)/ETI IJP(c) DS/JD/WW

ACC NR: AP6030236 SOURCE CODE: UR/0030/66/000/008/0107/0110

42
40
B

AUTHOR: Deryagin, B. V. (Corresponding member AN SSSR)

ORG: None

TITLE: Recent advances in the problem of surface forces [conference in Moscow]

SOURCE: AN SSSR. Vestnik, no. 8, 1966, 107-110

TOPIC TAGS: surface film, surface active agent, adhesion, surface phenomenon, scientific conference

ABSTRACT: The article is a report on the Third Conference on Surface Forces held at the Institute of Physical Chemistry, Academy of Sciences SSSR in the first part of 1966. The conference was organized by the Department of Surface Phenomena at the Institute which had just celebrated its 30th anniversary and by the section of surface phenomena and dispersion systems of the Scientific Council on Physical and Chemical Mechanics, Surface Phenomena and Dispersion Systems. More than 500 specialists from 38 cities in the Soviet Union representing research and educational institutes and industrial enterprises took part in the conference. About 70 reports were heard and discussed. The titles and brief summaries of the contents of some of the principal reports are given together with the names of their authors. Some of the topics covered were the properties of hydrophilic surfaces, measurement of the electric di-

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pole moment of colloidal particles and bacteria, epitaxial and crystallization action at a distance of crystal surfaces, stability of lyophobic systems, the characteristics of electrokinetic phenomena in extremely thin films, transfer and flow of solutions in porous membranes under the effect of concentration differential, adhesion of solids and destruction of sheet glass. The topic of the next conference which will be held in the beginning of 1968 will be "Surface Forces in Thin Films".

SUB CODE: 20/ SUBM DATE: None

ACC NR: AP6037029 SOURCE CODE: UR/0069/66/028/006/0777/0780

AUTHOR: Averbakh, K. O. (Moscow); Gol'din, G. S. (Moscow); Deryagin, B. V. (Moscow); Smirnov, O. K. (Moscow)

ORG: none

TITLE: Formation of hydrosol in hydrocarbon media at low temperatures

SOURCE: Kolloidnyy zhurnal, v. 28, no. 6, 1966, 777-780

TOPIC TAGS: hydrosol particle, hydrosol in toluene, hydrosol formation, toluene, hydrocarbon

ABSTRACT: A study has been made of the formation kinetics of hydrosol particles in toluene by ultramicroscopy. The equipment and procedure are described in the text. The effects of the time of the appearance of hydrosol nuclei, and of the water content and temperature of toluene on the formation of the aqueous phase were investigated. The experiments were conducted with toluene containing 0.014—0.024% water. It was shown that at -5 to -8C the particle concentration first increases rapidly with time, and then more slowly as the water content of the toluene drops; the rate of formation of hydrosol particles increases with the water content of the toluene. Experiments conducted in a wide temperature range indicated that the rate of formation of hydrosol particles increases with dropping temperatures. Orig. art. has: 4 figures.

SUB CODE: 21/ SUBM DATE: 11May66/ ORIG REF: 011/ OTH REF: 002/ ATD PRESS: 5107

UDC: 541.18.054

Card 1/1

L 35390-66 EWT(m)/T IJP(c) DS/WW

ACC NR: AP6026841 SOURCE CODE: UR/0069/66/028/001/0155/0157

52
B

AUTHOR: Lyashev, K. F.; Dukhin, S. S.; Deryagin, B. V.

ORG: Institute of General and Inorganic Chemistry, AN UkrSSR, Kiev (Institut obshchey i neorganicheskoy khimii AN UkrSSR)

TITLE: Effect of soluble surface-active substances on the rate of evaporation of fine water droplets

SOURCE: Kolloidnyy zhurnal, v. 28, no. 1, 1966, 155-157

TOPIC TAGS: evaporation, surface active agent, thermodynamic law, adsorption

ABSTRACT: In earlier work by the authors, the effect of surface-active substances on the evaporation of water droplets was studied. The relations between the length of the time of evaporation and the radius of the droplets that followed from the experimental data indicated that evaporation was slowed down by the presence of the surface-active agents. The nature of these relations (expressed by curves with an inflection showing a decrease in the rate of evaporation after a certain time) was consistent with the assumption that as a result of the increase of the concentration of the surface active agent in the adsorption layer and a change in the structure in this layer there was either a reduction of the coefficient of condensation or an increase in the resistance to diffusion in the layer. The interpretation given by the authors to the phenomena observed did not conflict with present-day theories concerning the effect of monolayers on evaporation or with the laws of thermodynamics. Orig. art. has: 1 figure and 4 formulas. [JPRS: 36,455]

SUB CODE: 07 / SUBM DATE: 04Mar65 / ORIG REF: 002 / OTH REF: 001

UDC: 541.18:533

Card 1/1

BAZARON, U.B.; DERYAGIN, B.V.; BULGADAYEV, A.V.

Shearing elasticity of liquids and their boundary layers investigated by a dynamic method. Dokl. AN SSSR 166 no.3:639-642 Ja '66. (MIRA 19:1)

1. Buryatskiy kompleksnyy nauchno-issledovatel'skiy institut Sibirskogo otdeleniya AN SSSR i Institut fizicheskoy khimii AN SSSR. 2. Chlen-korrespondent AN SSSR (for Deryagin). Submitted July 24, 1965.

L 07130-67 EWT(m)/EWP(j) DS/WW/RM

ACC NR: AP7001041

SOURCE CODE: UR/0020/66/167/003/0617/0620

AUTHOR: Deryagin, B. V. (Corresponding Member of the Academy of Sciences USSR); Fedoseyev, V. A.; and Rozentsvayg, L. A.

ORG: none

TITLE: Investigation of the adsorption of cetyl alcohol vapors and its effect on the evaporation of water drops

SOURCE: AN SSSR. Doklady, v. 167, no. 3, 1966, 617-620

TOPIC TAGS: adsorption, evaporation

ABSTRACT: Up to now the possibility of applying an insoluble film on the surface of water has not been studied due to the adsorption of vapors. In this work the rate of evaporation of water droplets was investigated, after maintaining them in an atmosphere, saturated with cetyl alcohol for a certain length of time. It was shown that cetyl alcohol vapors are adsorbed on the surface of a drop, and sharply slow the rate of evaporation in the case where the monolayer is saturated. A method is described which permits the study of the isotherms of vapor adsorption and also to simultaneously study both the kinetics of evaporation of droplets in the presence of various monolayers and the kinetics of adsorption of vapors of certain high molecular compounds on the surface of these droplets. It is possible to experimentally determine the heat of adsorption, lifetime of molecules in the adsorbed state, and the diffusion coefficient of low-volatile substances such as cetyl alcohol.

Card 1/2

0924 0051

L 07130-67

ACC NR: AP7001041

Orig. art. has: 4 figures and 3 formulas. [JPRS: 36,455]

SUB CODE: 07,20 / SUBM DATE: 04Nov65 / ORIG REF: 004 / OTH REF: 005

Card 2/2 LC

ACC NR: AP6036046 SOURCE CODE: UR/0056/66/051/004/0969/0982

AUTHOR: Bazaron, U. B.; Deryagin, B. V.; Bulgadayev, A. V.

ORG: Buryat Scientific Research Institute for Comprehensive Studies, Siberian Department, Academy of Sciences SSSR (Buryatskiy kompleksnyy nauchno-issledovatel'skiy institut Sibirskogo otdeleniya Akademii nauk SSSR); Institute of Physical Chemistry, Academy of Sciences SSSR (Institut fizicheskoy khimii Akademii nauk SSSR)

TITLE: Measurement of the shear elasticity of fluids and their boundary layers by a resonance method

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 51, no. 4, 1966, 969-982

TOPIC TAGS: shear modulus, shear stress, liquid property, elasticity theory, boundary layer, viscous fluid

ABSTRACT: This is a continuation of earlier work by one of the authors (Deryagin, ZhFKh v. 3, 1, 1932) in which it was shown that thin layers of water between two glass surfaces have a measurable shear modulus. The present article is devoted to the development of a method of measuring such a shear modulus more precisely, at very small shear deformation amplitudes and at higher frequencies. Another purpose was to detect and measure the modulus for films considerably thicker than the boundary layers yet thin enough so that negligible damping of the shear waves occurs within them. The change in the resonance frequency of a piezoelectric quartz crystal, induced by the

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presence of a liquid film on a crystal face under a quartz cover plate, is measured for very small vibration amplitudes. For low-viscosity liquids (water and benzene) the shear modulus is found to be of the order of 10^4 - 10^5 dyne/cm^2. With increase in the crystal vibration amplitude, the effective shear modulus decreases and the relative influence of the dissipative forces increases. For nonpolar liquids, the shear modulus remains unchanged at all distances from the quartz surface, whereas for polar liquids (water, alcohol, etc.) it increases sharply upon approaching to within 600 - 900 Å of the surface. The shear modulus for very thin water films is found to be in qualitative agreement with the earlier measurements. The construction of the quartz crystal and the experimental procedure are described in detail. The theory of the method and the appropriate calculations are given. The results demonstrate that volume shear elasticity exists in all liquids and can be measured by this method. It is concluded that the thin boundary layers of polar liquids possess special mechanical properties that result from a higher degree of molecular ordering than in the interior of the liquids. Orig. art. has: 10 figures, 16 formulas, and 1 table.

SUB CODE: 20/ SUBM DATE: 06Dec65/ ORIG REF: 019/ OTH REF: 002

Deryagin, B. A.

AUTHOR: Deryagin, B. A.

32-2-31/60

TITLE: Some Improvements of the Deformation Measurements in the Determination of Residual Stress in Thin-Walled Rings (Tubes) (Nekotoryye usovershenstvovaniya v izmerenii deformatsiy pri opredelenii ostatochnykh napryazheniy v tonkostennykh kol'tsakh (trubakh))

PERIODICAL: Zavodskaya Laboratoriya, 1958, Vol. 24, Nr 2, pp. 206-208 (USSR)

ABSTRACT: The method of N. N. Davidenko (reference 3), which was further developed by P. Ye. D'yachenko and A. P. Dobychina (reference 1), was improved. Apart from other measures, the tension cells were protected against the action of the electrolyte by depositing a coating of epoxy resin with a thickness of 0,3 - 0,5 mm by repeated immersion. An equal protection was found to consist of a thin foil (0,5 - 0,7 mm) of an acid resisting caoutchouc, which was attached by means of a rubber adhesive and vulcanized at 100 - 120°C during 2 - 3 hours. The compensating tension-cell was stuck unto a thin metal plate (consisting of the same metal as

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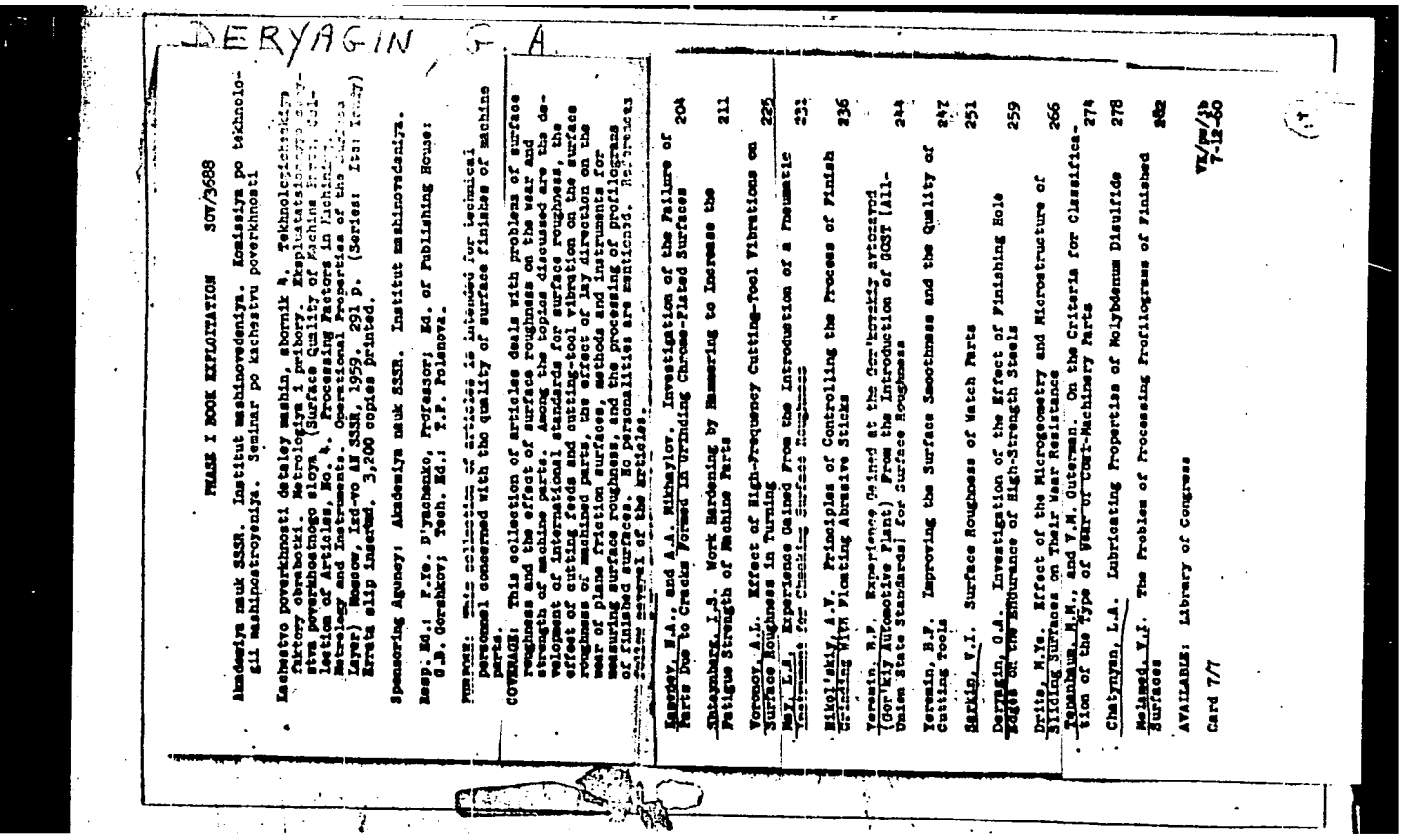
Some Improvements of the Deformation Measurements in the Determination of Residual Stress in Thin-Walled Rings (Tubes) 32-2-31/60

the investigated sample) for the purpose of preventing any influence of temperature and of other disturbations. From the results of the measurements conducted according to various methods it was found, that the measuring method mentioned above by means of this improvement operates with an accuracy of $\pm$ 0,5μ. The influence of tangential residual stress on the results of the deformation measurements is given graphically. There are 3 figures and 2 references, 1 of which is Slavic.

AVAILABLE: Library of Congress

1. Thin-walled rings-Deformation-Measurement 2. Stresses-Determination

Card 2/2



DERYAGIN, B. A.

PHASE I BOOK EXPLOITATION SOV/3688

Akademiya nauk SSSR. Institut mashinovedeniya. Komissiya po tekhnologii mashinostroyeniya. Seminar po kachestvu poverkhnosti

Kachestvo poverkhnosti detaley mashin, sbornik 4. Tekhnologicheskiye metody obrabotki. Metrologiya i pribory. Ekspluatatsionnyye svoystva poverkhnostnogo sloya. (Surface Quality of Machine Parts, Collection of Articles, No. 4. Processing Factors in Machine Metrology and Instruments. Operational Properties of the Surface Layer) Moscow, Izd-vo AN SSSR, 1959. 291 p. (Series: Its: Trudy) Errata slip inserted. 3,200 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Institut mashinovedeniya.

Resp. Ed.: P.Ye. D'yachenko, Professor; Ed. of Publishing House: O.B. Gorshkov; Tech. Ed.: T.P. Polenova.

PURPOSE: This collection of articles is intended for technical personnel concerned with the quality of surface finishes of machine parts.

COVERAGE: This collection of articles deals with problems of surface roughness and the effect of surface roughness on the wear and strength of machine parts. Among the topics discussed are the development of international standards for surface roughness, the effect of cutting feeds and cutting-tool vibration on the surface roughness of machined parts, the effect of lay direction on the wear of plane friction surfaces, methods and instruments for measuring surface roughness, and the processing of profilograms of finished surfaces. No personalities are mentioned. References accompany several of the articles.

AVAILABLE: Library of Congress

Card 7/7

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7-12-60

DERYAGIN, Georgiy Aleksandrovich; KOSHELEV, G.M., inzh., retsenzent; YEROKHIN, A.A., kand.tekhn.nauk, retsenzent; KONDRATOV, A.S., kand.tekhn.nauk; KONOROV, L.A., dotsent, kand.tekhn.nauk, red.; TOKAR', V.M., red.; GARNUKHINA, L.A., tekhn.red.

[Using technological methods for increasing the durability of machine parts] Povyshenie vynoslivosti detalei mashin tekhnologicheskimi metodami. Moskva, Gos.nauchno-tekhn.izd-vo Oborongiz, 1960. 202 p. (MIRA 13:11)
(Machine-shop practice)

PHASE I BOOK EXPLOITATION SOV/4897

Deryagin, Georgiy Aleksandrovich

Povysheniye vynoslivosti detaley mashin tekhnologicheskimi metodami (Increasing the Endurance of Machine Parts Through Processing Methods) Moscow, Oborongiz, 1960. 202 p. Errata slip inserted. 4,500 copies printed.

Reviewers: G. M. Koshelev, Engineer; A. A. Yerokhin, Candidate of Technical Sciences; A. S. Kondratov, Candidate of Technical Sciences; Ed.: L. A. Konorov, Docent, Candidate of Technical Sciences; Ed. (inside book): V. M. Tokar'; Tech. Ed.: L. A. Garnukhina; Managing Ed.: S. D. Krasil'nikov, Engineer.

PURPOSE: This book is intended for designers, process engineers, scientific workers, and students at aviation schools.

COVERAGE: The author discusses the problem of increasing the endurance of machine parts by the use of more efficient processing methods. He analyzes the effect of the most commonly used methods of mechanical machining on the surface quality and strength of parts made of

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high-strength steels and aluminum alloys which operate under alternating loads. Hole-machining methods contributing to increased endurance of bolted and riveted joints are examined; the results of investigations regarding the effect of various process factors on the endurance of these joints are described. Particular attention is given to the method for determining the residual stresses in the surface layer of metal affecting the strength of parts under cyclic loading. The author thanks P. Ye. Dyachenko, Doctor of Technical Sciences, Professor, for his scientific advice and suggestions, and V. I. Blokhin for carrying out the experimental work. There are 61 references: 57 Soviet, 3 German, and 1 English.

TABLE OF CONTENTS:

S/514/61/000/005/004/014
I007/I207

AUTHOR: Dery[illegible], G...

TITLE: The influence of the quality of surface layer on the fatigue strength of components subjected to increased cyclic stresses

SOURCE: Akademiya nauk SSSR. Komissiya po tekhnologii mashinostroyeniya. Seminar po kachestvu poverkhnosti. Trudy. no. 5, 1961. Kachestvo poverkhnosti detaley mashin; metody i pribory, uprochneniye metallov, tekhnologiya mashinostroyeniya, 79-87

TEXT: This is a report on tests carried out on 30XГСА(20khGSA) and 30XГСНА(20khGSNA) steel specimens in order to find ways of improving the fatigue strength and endurance limit of components working under increased cyclic loads. No description of test equipment is given. The specimens were subjected to a great variety of machining operations and cyclic loads; the comparative results are presented in tables and discussed in detail. With the increase in cyclic load the effect of residual stresses and surface hardness on the endurance limit decreased,

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I007/I207

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while the influence of surface roughness increased. The endurance limit of components with stress concentrations, markedly increases as a result of improved surface quality. The results are of particular value for the choice of suitable cold-working operations and conditions for obtaining improved surface qualities with a greater endurance limit. There are 6 tables and 1 figure.

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L 11797-66 EWT(d)/EWT(m)/EWP(w)/EWP(c)/EWA(d)/EWP(v)/T/EWP(t)/EWP(k)/EWP(z)/EWP(b)/EWP(l)/EWA(h)/EWA(c)/ETC(m) MJW/JD/WW/HW/EM/GS

ACC NR: AT6000064 SOURCE CODE: UR/0000/65/000/000/0093/0099

AUTHOR: Deryagin, G. A.

ORG: Conference on Strengthening Machine Parts, Moscow (Soveshchaniye po uprochneniyu detaley mashin)

TITLE: Strengthening of the covered parts of turbine blades by surface peening

SOURCE: Soveshchaniye po uprochneniyu detaley mashin. Moscow, 1962. Uprochneniye detaley mashin mekhanicheskim naklepyvaniyem (Work hardening of machine parts); trudy soveshchaniya. Moscow, Izd-vo Nauka, 1965, 93-99

TOPIC TAGS: surface hardening, cold rolling, metal finishing, turbine, turbine blade, fatigue test, metal stress, metal heat treatment, metal machining

ABSTRACT: To determine the effects of surface hardening on the strength of the covered parts of turbine blades (Christmas tree joints), specimens of EI-437B steel were subjected to long duration strength and bending fatigue tests at high temperatures. After heat treatment to produce yield stress of 89 kg/mm^2, 25-26% elongation, 90 plain specimens and 90 specimens with a stress concentration groove were machined. Half of the grooved specimens were cold rolled (at the groove) with a three-roller device (50-kg load, 3--4 passes) with profiled rollers. The grooves on the other 45 specimens were machined to a class 6 finish with a profiled grinder. Similarly, 45 of the plain specimens were cold rolled (15 kg; 25-mm diameter, 5-mm radius

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ACC NR: AT6000064

rollers; 0.1 mm/rev feed), and the other 45 were ground to a class 7—8 finish. Duration strength and fatigue tests were performed at 600C. It was found that for smooth specimens the effect of surface hardening on duration strength was negligible but that fatigue strength was affected. Notched specimens showed effects in both tests. The following conclusions were drawn from these and supplementary experiments: surface working of EI-437B specimens with stress concentrators improves the durability and fatigue properties up to 600C; the threshhold temperature above which the effects are reversed is 650C for EI-437B; since the covered parts of turbine blades remain at 500-550C, their strength can be improved considerably by surface hardening; these results can be obtained by a 30% surface hardening to a depth of 50—60 micron (leaving a class 7—8 finish). Orig. art. has: 7 figures and 2 tables.

SUB CODE: 11,13/ SUBM DATE: 24Apr65

HW

Card 2/2

S/120/62/000/005/022/036
E192/E382

AUTHOR: Deryagin, V.N.

TITLE: An electronic switch based on semiconductor diodes

PERIODICAL: Pribory i tekhnika eksperimenta, no. 5, 1962, 130 - 131

TEXT: The switch can be used as a phase-modulator in phase-detectors and other devices. Its circuit is shown in Fig. 1. This operates as follows. Two high-frequency voltages having a phase difference of 180° are applied to the points a and б. If no signal is fed from the audiogenerator (Fig. 1), no output is produced at the point A. When a signal from the generator is applied, this is transmitted to the diode D_1 through resistances R_1 and R_3 and to the diode D_2 through resistances R_2 and R_4. During the positive half-cycle of the audio-signal, the bias of D_1 is positive and the signal from the point a appears at the point A, while D_1 is closed by the negative bias. During the next half-cycle, the

situation is reversed and the voltage at point A is in opposite phase. Since the amplitudes of the high-frequency signals at A should be identical, it is necessary to have: $R_1 = R_2$, $R_3 = R_4$ and $C_1 = C_2$. The values of C_1 and C_2 should be chosen so that $\tau = C_{1,2} \times R_5 \gg T_B$ and $\tau \ll T_H$, where T_B is the period of high-frequency input signal and T_H is the period of the biasing voltage. A multivibrator can be used as a modulator instead of the audiogenerator. There are 2 figures.

ASSOCIATION: Gosudarstvennyy opticheskiy institut (State Optics Institute)

SUBMITTED: December 22, 1961

Card 2/2

L 25703-66 EWT(d)/EWT(l)/EWA(h) BC

ACC NR: AP6002820 SOURCE CODE: UR/0237/60/000/012/0010/0014

60
59
B

AUTHOR: Deryagin, V. N.; Miroshnikov, M. M.

ORG: none

TITLE: A light detecting range finder with an electron-optical converter 25

SOURCE: Optiko-mekhanicheskaya promyshlennost', no. 12, 1960, 10-14

TOPIC TAGS: image converter, optic range finder, incidence light, electron optics, light reflection, phase modulation

ABSTRACT: The principle of operation and basic characteristics of a new type phase light detecting range finder, in which the registration of light reflected by the terminal reflector and the measurement of the variation of phase modulation is conducted by means of an electron-optical image converter, is described in this paper. The first such instrument was constructed by A. A. Lebedev and associates of his laboratory in 1949 (Trudy GOI, 25, 1957, no. 150, Oborongiz). The authors continued this project in 1958, and succeeded in developing a compact range finder equipped with an electron-optical converter, with an accuracy of ±30 cm during measurements at a distance of 3 km. A block diagram of the range finder is given in fig. 1. The light from the source (1) is modulated at a high frequency by the modulator (2) and illuminates an angular mirror (4), which is located at some distance. The light reflected by the mirror is focused at the photocathode of the electron-optical converter (5) in the form of a luminous dot. The high frequency voltage from the generator (8) excites

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the light modulator through the amplifier (3) and proceeds to the deflecting plates of the electron-optical converter through the amplifiers (6) and (7). The instrument is equipped with a neutral prism (9). The measured distance is determined according to the formula

$$D = \frac{v}{2f}\left(\frac{N}{K} + \frac{\varphi^{\circ}}{360}\right) \qquad (1)$$

where v is the speed of light; f is the frequency of evolution; N is the whole number of semiwaves of modulated light; K is the whole number equalling the ratio of the light modulation frequency to the evolution frequency; φ° is the difference between the phase modulation of the incident and reflected lights. The authors conclude that based on tests the mean quadratic error of a number of phase readings per one distance did not exceed ± 3, which corresponds to ± 25 cm at a distance up to 2.5 km. Orig. art. has: 6 figures and 8 formulas.

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ACC NR: AP6002820

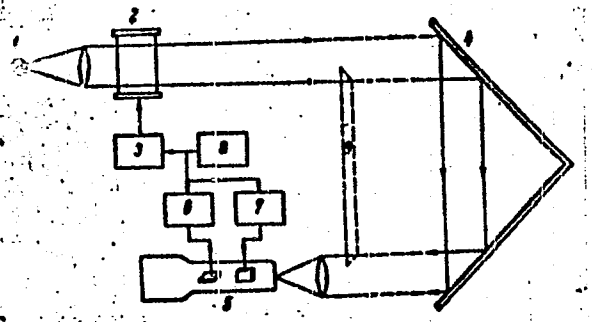


Fig. 1. Block diagram of range finder: 1-light source; 2-diffraction modulator; 3-power amplifier; 4-angular reflector; 5-electron-optical converter; 6-7-evolvement intensity amplifiers; 8-5mc voltage generator.

SUB CODE: 17/ SUBM DATE: 14Sep60/ ORIG REF: 004/ OTH REF: 000

Card 3/3

PAVLOVA, K.A.; PANTELEYEVA, B.D.; DERYAGINA, E.N.; KALECHITS, I.V.

Effect of nonstoichiometric sulfur on the activity of sulfide catalysts. Kin.i kat. 6 no.3:493-498 My-Je '65.
(MIRA 18:10)

1. Institut nefte- i uglekhimicheskogo sinteza, Angarsk.

DERYAGINA, F.A.

Nature of lactation in cows. Trudy Komi fil. AN SSSR no.9:16 22 '60. (MIRA 15:1)

(LACTATION) (COWS)

GANELINA, I. Ye.; DERYAGINA, G.P.; KRIVORUCHENKO, I.V.: LIPOVETSKIY, B.M.

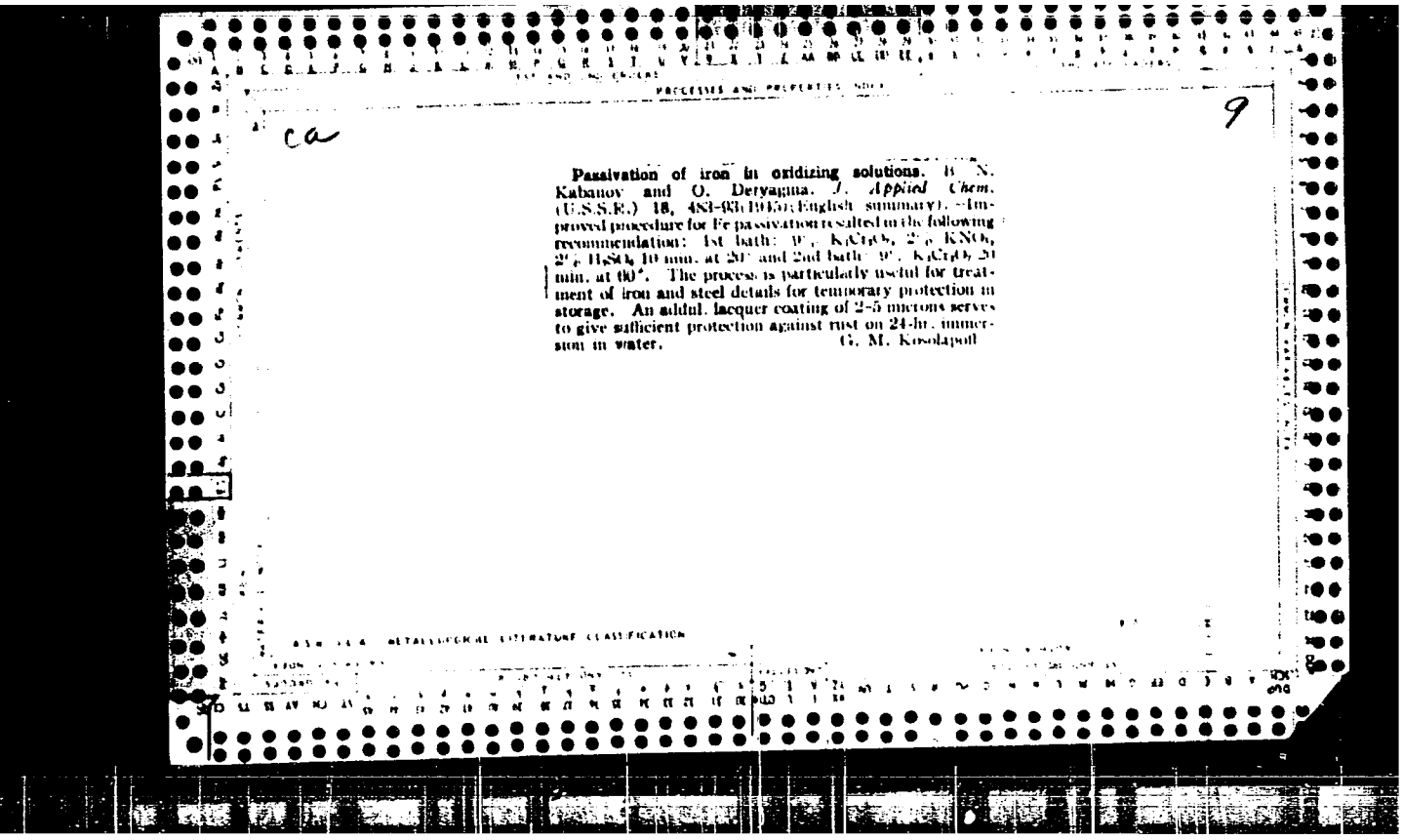
Blood lipids and some indices of the blood coagulation system.
Ter. arkh. 35 no.7:13-23 Jl'63 (MIRA 17:1)

1. Iz gruppy klinicheskoy i eksperimental'noy kardiologii (rukovoditel' - doktor med. nauk I. Ye. Ganelina) Instituta fiziologii (dir. - akademik V.N.Chernigovskiy) AN SSSR i III terapevticheskoy kafedry (zav. - prof. B.V. Il'inskiy) Gosudarstvennogo instituta dlya usovershenstvovaniya vrachey.

DERYAGINA, G.P.; KRIVORUCHENKO, I.V. (Leningrad)

Mechanism of the effect of iodine therapy in atherosclerosis.
Terap. arkh. 35 no.9:29-34 S'63 (MIRA 17:4)

1. Iz gruppy klinicheskoy i eksperimental'noy kardiologii (rukovoditel' - doktor med. nauk I.Ye. Ganelina) Instituta fiziologii (dir. akademik V.N. Chernigovskiy) AN SSSR i 3-y kafedry terapii (zav. - prof. B.V. Il'inskiy) Leningradskogo gosudarstvennogo-usovershenstvovaniya vrachey.



ca

9

Passivation of iron in oxidizing solutions. B. N. Kabanov and O. Deryagina. *J. Applied Chem.* (U.S.S.R.) 18, 483-93(1945)(English summary).—Improved procedure for Fe passivation resulted in the following recommendation: 1st bath: 9% $K_2Cr_2O_7$, 2% KNO_3, 2% H_2SO_4 10 min. at 20° and 2nd bath 9% $K_2Cr_2O_7$ 30 min. at 60°. The process is particularly useful for treatment of iron and steel details for temporary protection in storage. An alkyd lacquer coating of 2–5 microns serves to give sufficient protection against rust on 24-hr. immersion in water. G. M. Kosolapoff

AKIMOV, G.V.; STOKLISTKIY, L.I.; DERYAGINA, O.G.; YAMSHCHIKOV, I.N.

Apparatus for micro-electrochemical corrosion studies. Trudy Inst. Fiz. Khim., Akad. Nauk S.S.S.R. 3, Issledovaniya Korrozii Metal. No.2, 61-8 '51. (MLRA 4:10)
(CA 47 no.16:7831 '53)

DERYAGINA, G. V.

Chem Abs V48
1-25-54
metallurgy
metallography

(3) Met

Structure of metal and rate of corrosion with oxygen depolarization. G. V. Akimov and G. G. Deryagina (Inst. Phys. Chem. Acad. Sci., U.S.S.R., Moscow). *Zhur. Fiz. Khim.* 26, 282–95(1952).—The corrosion rate of pure metals and their alloys in stirred solns. was compared on the basis of the weight loss in the first 5 and 15 min. In 3*N* HCl, Al with 1% Fe (I) corroded 30–100 times faster than pure Al (II), while Al with 4% Cu (III) corroded only 1.2–4 times faster; cast iron corroded 5–7 times faster than Armco iron (IV) and pure Fe; Zn with 1% Fe (V) corroded 50–70 times faster than pure Zn (VI); Cd with 0.5% Cu (VII) and Pb with 0.5% Ag corroded with the same rates as the corresponding pure metals Cd and Pb; Cu and Cu with 0.5% Au (VIII) did not corrode; thus the second phase may or may not accelerate corrosion with H depolarization. In oxidizing solns. such as 3*N* HNO_3, and in 0.5*N* KI + 0.2*N* I_2 the second phase introduced by alloying did not have any influence on the corrosion rate. In other oxidizing solns., differences existed. In 10% $(NH_4)_2S_2O_8$ soln. some alloys corroded slightly faster than pure metals. In 3*N* HCl + 3*N* H_2O_2 and 3*N* HCl + 2*N* KNO_3, I and III corroded 6–17 times faster than II, V corroded 2–6 times faster than VI, and VII faster than Cd; other alloys corroded with the same rate as the corresponding pure metals. In aerated 3% NaCl soln., and in 3% NaCl + 0.3*M* H_2O_2 some alloys (I, III, VII) corroded somewhat faster, others (VIII, IV) slightly slower than the corresponding metals. The corrosion rate in NaCl was accelerated by H_2O_2 several times; in acidic soln. such as HCl, H_2O_2 addn. accelerated the corrosion 10–100 times. Thus also in corrosion with O depolarization the second phase in metal may accelerate the corrosion, although the effect is less frequent and less pronounced than in the case of H depolarization. A. D.

DE YAGINA O. V.

238T13

USSR/Chemistry - Corrosion Metals Aug 52

"The Use of Profilometers in the Study of Structural Corrosion," O. G. Deryagina and Corr Mem Acad Sci USSR G. V. Akimov

"DAN SSSR" Vol 85, No 6, pp 1305-1308

A mech profilometer with a stylus was used to measure the corrosion on a piece of Zn-Fe alloy. The corroding agent was 3 N HCl. A piece of pure Zn was treated with a mixt of $HCl+H_2O_2$ and also with $(NH_4)_2S_2O_8$ and the surface corrosion

238T13

measured and microphotographed. Solns contg NO_3 ions give Zn a mirror-smooth surface. In the study of corrosive disintegration, visual observation alone is insufficient. Use of a profilometer enables more complete representation of the character of the corrosion.

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Irreversible electrode potentials in oxidizing media. O. V. Akimov and O. T. Deryagina. *Trudy Inst. Fiz. Khim., Akad. Nauk S.S.S.R., No. 5, Issledovan. Korrozii Metal.* No. 4, 6-31(1955).--Irreversible electrode potentials of pure Al, Fe, Zn, Cu, and Pb and Al + 2% Fe, Zn + 2% Fe, Cd + 0.5% Cu, Pb + 0.6% Ag, and Cu + 0.5% Au and the corresponding corrosion rates in oxidizing and nonoxidizing media were investigated. In HCl the electrode potential of Fe, cast iron, duraluminum, and Al-Fe did not change when an oxidizing agent was added to the electrolyte. Fe and cast iron corroded with evolution of H, showing that H polarization took place. The addn. of a small amt. of foreign elements to the metals did not change their potential in nonoxidizing media. In oxidizing media the potential shifted toward more pos. values according to 2 types of reactions: (a) the initial value of the electrode potential of the alloy was more pos. than that of the pure metal; the difference remained during the variation of the potential as a function of time; (b) the initial values of the electrode potential of the alloy and of the pure metal were similar. The potential of the pure metal remained const. while that of the alloy became more pos. with time. In this case intense corrosion took place. In $(NH_4)_2S_2O_8$, Al was passivated; it became cathodic with respect to $FeAl_3$ in the alloy Al-Fe.

N. Goldowski

Deryagina, O. G.

Metal 2

Corrosion structures in oxidizing media. O. G. Deryagina. *Trudy Inst. Fiz. Khim., Akad. Nauk S.S.S.R.* No. 3, *Issledovan. Korrozii Metal.* No. 4, 32–39(1955).—The object of the work is the investigation of the initial stages of the development of "corrosion structures" (modification of the surface) of pure metals and alloys. The modification of the polished surfaces on immersion in corroding media was studied with a microinterferometer (for differences in levels lower than 1 μ) and with a mech. profilometer (for differences in levels up to 40 to 40 μ). The results obtained (represented in numerous photographs and profilograms) are: Zn and Cd in HCl (with H_2O_2 or KNO_3), in HNO_3 and $(NH_4)_2S_2O_8$ reveal their microstructures which fade into macrostructures on more prolonged attack. Zn-Fe alloy always reveals its microstructure with $FeZn_7$ remaining stable. Fe in HCl undergoes pitting corrosion. The addn. of H_2O_2 or KNO_3 increases appreciably the attack at the grain boundaries. Al suffers pitting corrosion in all acid media. Al-Fe alloy in HCl (with or without H_2O_2) undergoes pitting corrosion, while $FeAl_3$ remains unattacked; in HCl + KNO_3 the attack is limited, on $FeAl_3$. In $(NH_4)_2S_2O_8$, Al and its alloys are passivated at the initial stages, but Al starts to corrode at later stages, owing to the liberation of SO_4^{--}. NaCl + H_2O_2 induces a surface film on all metals. Corrosion starts at weak spots in the film and develops pits. N. Goldowski

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SOV/137-58-7-15368

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 7, p 205 (USSR)

AUTHOR: Deryagina, O.G.

TITLE: Microelectrochemical Methods of Investigation of Structural Corrosion (Mikroelektrokhimicheskiye metody issledovaniya strukturnoy korrozii)

PERIODICAL: Tr. In-ta fiz. khimii. AN SSSR, 1957, Nr 6, pp 69-78

ABSTRACT: Two methods of investigation of structural corrosion in metal are described. The first method permits a determination of both the difference of potentials between the separate structural components of the alloy and the distribution of the potential on the corroding surface. Distribution of the density of corrosion current (D) on the surface of the model or alloy is found by means of subsequent calculations. Microelectrochemical measurements are performed by means of a micromanipulator consisting of a microscope, a table for it with three micrometric screws for moving the specimen, and a micromanipulation column on which a capillary tube containing the comparison element is fixed. It is noted that for determining the distribution of the potential on the corroding surface the

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Microelectrochemical Methods of Investigation of Structural Corrosion

diameter of the capillary should be 1/5 - 1/10 that of the transverse dimension of the smallest structural component. It is also necessary to use lamp-type potentiometers or cathode voltmeters with a large input resistance (10^{10} - 10^{12} ohm). By employing the method developed on a Cu-Zn model in 0.02-N HCl+0.24% H_2O_2, the polarization characteristics of separate areas of the cathode located at different distances from its edge were studied, and a nonuniformity in the functioning of the cathode from the center to the periphery in the presence of large cathode inclusions was observed. The second method, namely, plotting of the profile of the corroding surface with a profilometer, permits the study of the depth and the character of the corrosion and therefrom the calculation of D at a specified distance from the cathode-anode border. Using the example of the curves of distribution of D of the anode obtained by the microelectrochemical method and the profilographing of the surface of a model of Cu-Zn, a virtually complete coincidence of results is demonstrated. Bibliography: 16 references.

P.S.

1. Metals--Corrosion 2. Corrosion--Microanalysis 3. Electrochemistry--Applications

Card 2/2

DERYAGINA, O.G.

AUTHOR TOMASHOV, N.D., DERYAGINA, O.G. 32-6-11/54

TITLE The Determination of the Inclination to Corrode of Intermediary Crystals of Metal Constructions.
(Opredeleniye sklonnosti svarnogo soyedineniya metallicheskikh konstruktsiy k mezhkristallitnoy korrozii -Russian)

PERIODICAL Zavodskaya Laboratoriya,1957,Vol 23, Nr 6, pp 679-682 (U.S.S.R.)
Received 7/1957 Reviewed 8/1957

ABSTRACT The investigation of the corrosion of intermediate crystals in the welding seams of newly produced steel objects are not carried out because "suitable methods are lacking". Such corrosions are mostly found to exist only after the material has already been used for some time and after the process of destruction has already been developed. It is suggested in the paper that such welding seams as incline towards corrosion should be detected as soon as possible without cutting out. From publications in scientific periodicals it may be seen that one and the same type of steel will show different degrees of inclination towards corrosion according to different kinds of heat treatment, and herefrom it may be followed that there are welding seams at different points of the steel sample which are subjected to different kinds of thermal influence. A test method to be employed in the case of steel objects made of stainless chromium nickel steel 1Х18Н9Т is described. As a solution 5% HNO_3+1% $FeCl_3$ is taken. It is shown by 1 table and 4 drawings that displacement towards the negative side of the potentials under the influence of the solution is particularly intense at the points of inter-crystal corrosion. This method

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The Determination of the Inclination to Corrode of Inter- 32-6-11/54
mediary Crystals of Metal Constructions.

is described as being of great practical use because the steel objects investigated are not damaged. On the basis of this principle is also possible to construct such apparatuses as permit control of the intercrystal corrosion properties of the steel seam without the loss of time.

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The surface distribution of the working effectiveness of the cathode under current conditions with oxidative polarization. N. D. Tomashov and O. G. Devyatina. (Inst. Chem., Acad. Sci. U.S.S.R., Moscow.) *Zhur. Fiz. Khim.* 31, 55-60 (1957).—Polymerization curves were obtained at distances of 10-1500 μ from the electrode edge in the corrosion study under conditions involving oxidation depolarization in 0.02*N* HCl and in 0.02*N* HCl + 0.12% (or 0.3%) H_2O_2. The effectiveness of the work on the cathode decreased greatly with increased distance from the edge, which corresponds with an increase in the polarizability of the cathode surface away from the edge. Near the cathode edge the diffusional control of the diffusion process may change through a regulation of the depolarizer reducing action because of the more ready supply of the depolarizer. At sufficiently small sizes of the microcathodes, and their sufficiently large distance from each other, the cathodic reaction regulates the process, while at larger cathode unit sizes the corrosion process will be controlled by the depolarizer diffusion rate.

W. M. Stern

DEVYATINA

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AUTHORS: Deryagina, O. G., Paleolog, Ye. N, and Tomashov, N. D.

TITLE: Electrochemical and Corrosion Behavior of Semiconductors in Electrolytic Solutions. III. Dissolution of Germanium in Contact With Other Metals

PERIODICAL: Zhurnal fizicheskoy khimii, 1960, Vol. 34, No. 9, pp. 1952-1959

TEXT: In the fusion of n-type germanium with indium, a narrow band of a p - n junction may be obtained. If electric contacts (Cu wires) are soldered onto the germanium and indium with tin, and if the whole is insulated against air with the exception of the free Cu wire ends (e.g., with an epoxy resin shell), a plate cathode Ge - In - Sn - Cu is obtained (Fig. 1). As the surface of this diode is edged before being embedded into the resin shell, the electrochemical behavior of Ge in the many-electrode system Ge - In - Sn - Cu was investigated, and the mechanism of its dissolution was explained. The experiments were carried out in 1 N NaOH solutions of different H_2O_2 contents (0.3 N H_2O_2 and 1.0 N H_2O_2), or in pure

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Electrochemical and Corrosion Behavior of Semiconductors in Electrolytic Solutions. III. Dissolution of Germanium in Contact With Other Metals

17.5 N H_2O_2 solutions. Samples of n-type Ge (of the type ДМ(DM) or БМ(BM)), In, Cu, and Sn embedded in polystyrene,[15] as well as pairs of n-type Ge-Cu and n-type Ge-In, and ready diodes (of the type ДГЦ-22 (DGTs-22)) were used. The area of the electrodes in the diodes investigated are given in Table 1. The corrosion current of Ge, as well as the quantity of the dissolved Ge were determined by a colorimetric method (Ref. 7); the surface profile of Ge was measured by means of a microscope, or the current density and dissolution rate of Ge (in the pair Ge-Cu) was calculated from the polarization diagram. A comparison between the experimental data and the calculated values (Table 2) shows that a self-dissolution of Ge takes place, and that the latter increases with the H_2O_2 content.

In the many-electrode system investigated, Ge is the anode and Cu is the most effective cathode, whereas Sn and In are highly polarized and, according to conditions, act as a cathode or anode. The total loss of n-type Ge (Table 3, Ge-Cu loss) in contact with Cu, In, and Sn is determined by the rate of anodic dissolution or self-dissolution, the ratio between

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Electrochemical and Corrosion Behavior of Semiconductors in Electrolytic Solutions. III. Dissolution of Germanium in Contact With Other Metals

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the two rates depending on the H_2O_2 content (Table 4), i.e., self-dissolution predominates in pure H_2O_2 solutions. The behavior of n-type Ge during etching in the afore-mentioned solutions corresponds to the activity of the Ge electrode in the system Ge - In - Sn - Cu, and is subject to electrochemical rules. There are 6 figures, 4 tables, and 8 references: 7 Soviet and 1 US.

ASSOCIATION: Akademiya nauk SSSR, Institut fizicheskoy khimii, Moskva (Academy of Sciences USSR, Institute of Physical Chemistry, Moscow)

SUBMITTED: December 13, 1958

Card 3/3

DERYAGINA, O.G.

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AUTHORS: Deryagina, O. G., Paleolog, Ye. N., Tomashov, N. D.

TITLE: Anodic Dissolution of Germanium With a p-n Transition

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 133, No. 2, pp. 388 - 391

TEXT: The objective of the present paper was to determine the conditions for a selective etching of the p-n transitions of germanium taking into account the electrochemical processes of the diode components at the boundary of the solution. The authors investigated the distribution of the potential, the current density, and the dissolving speed in the components of a germanium diode at various anodic polarizations. Indium-germanium diodes were used for the test in which germanium of the DM (DM) type, as well as a germanium single crystal with p-n transition were applied. The samples were embedded in epoxy resin and ground at a right angle to the In-Ge contact plane. They were then polished and after etching in H_2O_2 they were anodically polarized in 0.1 N NaOH or

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Anodic Dissolution of Germanium With a p-n Transition

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0.1 N H_2SO_4 at room temperature and in dispersed daylight. The positive pole of the circuit was connected to the indium. The potential distribution was measured with a capillary detector, the depth of the solution (the profile of the surface) with a Linnik double microscope. The width of the zone of p-type germanium was determined by the precipitation of copper with cathodic polarization of the p-n transition in pyrophosphate solution. Fig. 1 shows the curve of the anodic polarization of indium, p- and n-type germanium in 0.1 N NaOH. A strong polarization occurs in In and n-Ge. In contrast to In the high degree of polarization of n-type germanium is not due to passivity but to the low degree of hole concentration. Fig. 2 shows the potential distribution on the surface of the diode at an anode current of 0.05 - 4.00 ma, Fig. 2b shows the surface profiles after 60 min and Fig. 2v gives the amperages obtained. The current density of n-Ge is greater than that of the anode current on the boundary of the solution. In the authors' opinion this is due to the injection of holes in n-Ge above the p-n transition. This is confirmed by Fig. 3 which shows that the anodic polarization of the n-Ge surface decreases as the distance from the

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Anodic Dissolution of Germanium With a p-n Transition

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p-n transition increases. This is due to a decreased concentration of the injected holes. If the germanium diode is anodically polarized from indium a high degree of anodic polarization of indium occurs and it is above all the p-Ge and the adjacent zones of n-Ge which dissolve. With a cathodic polarization from n-Ge its dissolution can be stopped and concentrated to the narrow zone of p-Ge. Indium is not polarized in H_2SO_4 and mainly indium and the adjacent zone of p-type germanium are dissolved. Similar results were obtained with the germanium single crystal. Because of the different anodic polarizability of n-Ge, p-Ge, and In and because of the existing p-n transition a selective etching of a germanium diode or triode is possible. There are 3 figures and 9 references: 4 Soviet, 1 American, 3 British, and 1 German.

ASSOCIATION: Institut fizicheskoy khimii Akademii nauk SSSR (Institute of Physical Chemistry of the Academy of Sciences, USSR)

PRESENTED: February 3, 1960, by A. N. Frumkin, Academician

SUBMITTED: March 2, 1960

Card 3/3

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AUTHORS: Deryagina, O. G., Paleolog, Ye. N. and Tomashov, N.D.

TITLE: The mechanism of etching of p-n boundaries in monocrystals of germanium

PERIODICAL: Zhurnal prikladnoy khimii, v. 35, no. 6, 1962, 1276-1280

TEXT: Stationary potentials (E) of Ge were measured in relation to its type of conductivity and specific resistance (ρ), to explain the mechanism of etching. The specimens of Ge were mounted in plastic, polished, etched in hot H_2O_2, and experiments were then carried out in: (I) 1 N NaOH + 0.02 N K_3 $Fe(CN)_6$, and (II) 1.0 N NaOH + 1 N H_2O_2, in air, at room temperature. In II the stationary potentials were practically identical in the n and p regions ($\sim$-750 mv) and were independent of ρ. In I, $E_{(n)Ge}$ and $E_{(p)Ge}$ va-

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The mechanism of etching ...

ried by ~100 mv ($E_{(n)Ge}$ more negative) at $\rho \lesssim 1\ \Omega.cm$, and approached each other closely as ρ increased to 10 - 20 $\Omega.cm$. Studies of the (n)Ge - (p)Ge couples in I (polarization curves for (n) and (p)Ge) and microscopic observations showed that the anodic (n) regions dissolved preferentially at 0.034 - 0.038 $mg/cm^2.hr$ (corr. current density = 0.056 mA/cm^2). The etching was most pronounced near the boundary itself. No preferential etching was observed in II, concluding therefore that the preferential dissolution of (n) regions takes place only in solutions in which $E_{(n)Ge} \neq E_{(p)Ge}$.

There are 2 figures and 1 table.

SUBMITTED: June 7, 1961

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LERYAGINA, O. G.

Dissertation defended for the degree of Candidate of Chemical Sciences at the Institute of Physical Chemistry in 1962:

"Mechanism of the Dissolution of Germanium with the r-transition."

Vest. Akad. Nauk SSSR. No. 4, Moscow, 1963, pages 119-145

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ACCESSION NR: AP5009300 S/0364/65/001/003/0267/0273

AUTHOR: Deryagin, O. G.; Paleolog, Ye. N.

TITLE: Steady-state potentials of germanium in oxidizing media

SOURCE: Elektrokhimiya, v. 1, no. 3, 1965, 267-273

TOPIC TAGS: germanium oxidation, electrochemistry, steady state potential, oxidation potential, semiconductor oxidation, silicon oxidation, free electron concentration

ABSTRACT: The authors measured the steady-state potentials of germanium in various oxidizing solutions and attempted to account for the difference in the steady-state potentials of p-type and n-type germanium. Systematic measurements of the differential capacity at the germanium - electrolyte interface showed that, in solutions containing ferricyanide, the spontaneous dissolution of n-germanium is associated with the generation of excess carriers in the region of the space charge of the semiconductor; this causes changes in the potential of germanium as the volume concentration of free electrons changes. This also applies to silicon. During the spontaneous dissolution of germanium in acid

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solutions containing hydrogen peroxide, the charges liberated as the result of cathodic and anodic polarization cancel out. No changes in the steady-state potential of germanium with the volume concentration of free electrons are observed in this case. Orig. art. has: 8 figures and 3 formulas.

ASSOCIATION: Institut fizicheskoy khimii Akademii nauk SSSR (Institute of Physical Chemistry, Academy of Sciences of the SSSR)

SUBMITTED: 09Oct64 ENCL: 00 SUB CODE: IC

NO REF SOV: 000 OTHER: 009

Card 2/2

GLEBOVICH, Aleksandr Aleksandrovich, kand. tekhn. nauk, dots.; KASATKIN, A.S., prof., nauchn. red.; GEMAR, V.Yu., red.; DEVYAGINA, S.I., red.

[Laboratory work in electrical engineering and the principles of industrial electronics] Laboratornye raboty po elektrotekhnike s osnovami promyshlennoi elektroniki. Moskva, Vysshaia shkola, 1964. 185 p. (MIRA 17:6)

1. Zaveduyushchiy kafedroy elektrotekhniki Vsesoyuznogo sel'skokhozyaystvennogo instituta zaochnogo obucheniya (for Glebovich).

1. DEMYAGINA, V. P.; TALMUD, S. L.

2. USSR 600

4. Paper Industry

7. Difficulties in the paper industry caused by cellulose pitch, Koll. zhur, 15, No. 1, 1953.

9. Monthly List of Russian Accessions, Library of Congress, April 1953, Uncl.

BAGROVA, R.Kh.; DERYAGINA, Ye.S.; KOZLOV, V.N.

Results of investigating the yield of the products of poplar wood pyrolysis. Trudy Inst.khim.UFAN SSSR no.6:29-32 '61.
(MIRA 16:2)
(Wood distilation)

ZUBAIROV, D.M.; DERYANINA, G.I.

Effect of changes in blood coagulation on the adhesive capacity of thrombocytes. TSitologiia 4 no.4:465-467 Jl-Ag '62. (MIRA 15:9)

1. Kafedra farmakologii Kazanskogo meditsinskogo instituta.
(BLOOD PLATELETS) (BLOOD--COAGULATION)

DERYAPA, N.R., kand.med.nauk

A short summary of medical research during the work of the Soviet Antarctic Expedition. Inform.biul. Sov. antark.eksp. no.49:44-47 '64. (MIRA 18:5)

1. Shestaya kontinental'naya Antarkticheskaya ekspeditsiya.

DERYAPA, N.R. (Leningrad)

Plasma substitute properties of aminopeptide hydrolysate in the treatment of acute massive hemorrhages in animals. Pat.fiziol.i eksp. 4 no.2:67-68 Mr-Ap '60. (MIRA 14:5)

1. Iz kafedry voyenno-polevoy terapii (nachal'nik - prof. B.D. Ivanovskiy) Voyenno-meditsinskoy ordena Lenina akademii imeni S.M.Kirova.
(BLOOD PLASMA SUBSTITUTES) (HEMORRHAGE)

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BOOK EXPLOITATION

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Deryapa, Nikolay Romanovich

Nature of the Antarctic and acclimatization of man (Priroda Antarktiki i akklimatizatsiya cheloveka) Moscow, Izd-vo "Nauka," 1965. 154 p. illus., biblio. (At head of title: Akademiya nauk SSSR. Geograficheskoye obshchestvo Soyuza SSR) 1200 copies printed

TOPIC TAGS: antarctic climate, climatology, climatic influence, physical geography

PURPOSE AND COVERAGE: General results of medical research in the Antarctic covering the entire period of its exploration are presented for the first time in Soviet literature. The book is based mainly on the author's personal medical-geographic and clinical-physiologic research conducted during the Sixth Soviet Antarctic expedition in 1960--1962. The problem of man's acclimatization is studied in connection with physico-geographic properties of various regions of the Antarctic and living conditions of those who stay through the winter. Comparisons with analogical research in the Arctic are given. Conclusions and recommendations concerning the medical ser-

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vice for Antarctic expeditions are made. The book is intended for polar explorers, physicists, geographers, and for all those interested in the problems of the Antarctic. There are 480 references of which 370 are Soviet.

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SUB CODE: LS, ES SUBMITTED: 11Mar65 NO REF SOV: 370

OTHER: 115

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ACC NR: AT7003028 SOURCE CODE: UR/3174/64/000/049/0044/0047

AUTHOR: Deryara, N. R. (Candidate of Medical Sciences)

ORG: Sixth Continental Expedition (Shestaya kontinental'naya ekspeditsiya)

TITLE: Brief review of medical research conducted by the Soviet Antarctic Expedition

SOURCE: Sovetskaya antarkticheskaya ekspeditsiya, 1955-. Informatsionnyy byulleten', no. 49, 1964, 44-47

TOPIC TAGS: nervous system, cardiovascular system, medical research

ABSTRACT:

Polar workers wintering in Antarctica are exposed to a complex of unfavorable factors in the external environment. Even modern Antarctic stations are insufficiently equipped to deal with the effects of these factors on man, necessitating study of biomedical problems, particularly human acclimatization.

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Extensive material gathered by physicians in the Soviet Antarctic Expedition will provide a temporary basis for scientific advice on the medical support required for expeditions, a consideration which causes the results of observations on acclimatization of people wintering in various Antarctic regions to be of interest.

Shore Stations

The studies were done mainly at the "Mirnyy" Observatory. G. A. Barashkov[1,2] and N. R. Paleyev[3,4] investigated climatic and geographic factors, the former studying Antarctic nature and its influence on man and also morbidity during the Expedition, the latter the influence of the Central Arctic and Antarctic climates on the human organism and human adaptation to polar climatic conditions. Vegetative shifts of the organism during acclimatization in Antarctica were investigated by N. R. Deryapa[5], while I. V. Shastin[6,7] studied peculiarities of acclimatization and cardiovascular disorders among those wintering in Antarctic stations. In addition, general descriptions

and the scientific results of the Third (1957--1959) and Fourth (1958--1960) Continental Expeditions were compiled (Trudy, v. 16 and v. 26).

Opening of new Soviet stations allowed expansion of the program for medical observation of acclimatization. L. I. Rogozov[8,9] recorded acclimatization and morbidity of polar workers at Novolazarevskaya station in 1961 and reported an operation he performed on himself.

All the physicians noted various functional organic changes in polar workers. Acclimatized shifts were first expressed in such subjective disturbances as changes in sleep, shortness of breath during heavy work, and variously localized pain. It was thought that these disturbances indicated loss-of-adaptation neuroses which, according to G. M. Danishevskiy's theory, are particularly frequent during initial acclimatization and reflect the weakness of humans exposed to new external environmental conditions. The disturbances were temporary in most cases and often went untreated; full acclimatization was achieved through compensating mechanisms by the end of wintering [N. R. Deryapa].

The weight of workers at "Mirnyy" increased after their arrival in Antarctica during all expeditions; variations were seasonal, with a

Changes in the nervous and cardiovascular systems were studied in greatest detail. The development of physiologically compensating reactions was demonstrated in a majority of cases; however, significant changes leading to the onset of illness appeared in others [G. A. Barashkov 1963, N. R. Deryapa, I. V. Shastin 1962a, 1962b].

Studies of conditioned reflexes showed increase in inhibitory processes in the cerebral cortex toward the end of the expedition, indicating a state of exhaustion. Numerous clinical indexes of vegetative innervation demonstrated the development of normal adaptive changes in the nervous system for a majority of workers during acclimatization. Changes resembling patterns of neuroses were compensated for and treated [N. R. Deryapa].

Vasoconstriction caused by the polar climate was not evident at the shore stations. Paleyev[3,4] noted a tendency to a 15%—25% reduction in arterial pressure among those wintering at "Mirnyy;" however, further studies by Deryapa[5] and Shastin[6,7] recorded various shifts in arterial pressure, as well as preservation of normal levels. Information on the functional state of the cardiovascular system under various conditions (rest, cold) was obtained by tachooscillography and

sphygmography. The significant frequency of disturbances in the heart's bioelectric and mechanical action was thought to indicate the extent of cardiovascular acclimatization shifts [Shastin 1962a, 1962b].

Intracontinental Stations

Information on human acclimatization in regions of the earth's severest natural conditions was obtained for the first time. Inhabitants of the high-latitude Antarctic Vostok Station were the subjects for N. V. Bystrov's[10] investigation of fluctuations in hemodynamic indexes during wintering and I. I. Tikhomirov's[11] observations of cardiovascular activity (1959). Problems of human acclimatization in the intracontinental regions of Antarctica[12], and the process of acclimatization at the cold pole of the world in Antarctica[13] were also investigated. Warming of inhaled air without external sources of heat was reported by I. I. Tikhomirov and D. A. Nizyayev[14]. The articles[15,16] on the Third and Fourth Continental Expeditions also discuss acclimatization in these regions.

The process of acclimatization is divided into three periods by all the authors: initial period, polar night, and polar day. The elevation of the stations (about 3500 m) caused high-altitude hypoxia, and was the major constant factor producing adverse human effects.

Both subjective and objective changes were significantly more pronounced in the intracontinental polar workers than in workers at the shore stations. The initial period of acclimatization at the intracontinental stations was characterized by altitude sickness; a lack of altitude adaptation in individual cases required evacuation by plane to "Mirnyy".[16]

Weight loss, maximal at the end of the polar night, was noted among the intracontinental polar workers; however, weight returned to normal by the end of wintering. Substantial changes in dynamometric indexes were not permanent.

The nervous, cardiovascular, and other systems displayed sharpest shifts during the initial period of acclimatization. The shifts depended on the degree of individual adaptation to the conditions of intracontinental wintering, particularly high-altitude hypoxia. Acclimatization

developed gradually as the organism shifted to the new functional level, so that hemodynamic and other changes were minimal at the end of wintering [Bystrov, 1962]. Arterial pressure showed distinct drops. Acclimatization thus placed great stress on the compensatory mechanisms.

The possibility of human life and work at ultralow temperatures (below -80° C) with utilization of specialized protective measures against cold such as climatic clothing, warming of inhaled air, etc., was demonstrated for the first time.

Intracontinental Sled-Drawn Tractor Expeditions

Important data on human activity were obtained on expeditions into the most inaccessible regions of Antarctica. U. V. Gavrilov[17] studied the significance of adaptation in tolerance to low atmospheric pressure and temperatures [see also 3, 5, 6, 7, 15]. The extreme conditions of the central high-altitude regions of the continent and the difficulties of the expeditionary way of life placed increased demands on human stamina. It was found that the relatively slow movement

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of sled-drawn tractor expeditions from "Mirnyy" along the Antarctic ice sheet allowed more complete high-altitude adaptation than did transfer by plane.

Various adaptive reactions were observed on these expeditions, some of which lasted four months. The effect of high-altitude hypoxia was particularly pronounced. A significant weight loss in spite of adequate feeding occurred. The heart was constantly overloaded. Conditioned reflex activity on expedition was essentially the same as at "Mirnyy." A tendency toward a reduction in hemodynamic shifts was observed; however, exhaustion and asthenia increased.

Studies of human acclimatization during the Soviet Antarctic Expeditions revealed various organic changes demonstrating the process of adaptation to the unusual and severe conditions of Antarctica. However, many mechanisms of the adaptive process merit further investigation using advanced scientific methods. /FSB: v. 2, no. 6/

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